DMS-8500, Non-reflective Background Coatings

Overview

(Formerly D-9-8500, Non-reflective Background Coatings).

Effective Date: August 1998 – June 2003.

This specification shall govern for the materials, composition, quality, sampling, and testing of non-reflective background coatings.

Bidders' and/or Suppliers' Requirements

All prospective bidders and/or suppliers are notified that, before any material is considered, the material proposed for submission shall be a material that has been previously submitted for testing and complies with the durability and other requirements of this specification.

Payment

Procurement by the State

All materials governed by this specification will be paid for in accordance with provisions of the purchase order awarded by the State.

Contracts

All materials governed by this specification utilized in the production of sign panels or completed backgrounds will be considered as subsidiary to the bid item in the contract.

Prequalification and Performance History

Prequalification

Manufacturers who desire to prequalify their product should contact: Texas Department of Transportation, Construction Division, Director of Materials & Pavements Section (CP51), 125 East 11th Street, Austin, TX 78701-2483.

All materials for prequalification tests will be submitted at no cost to TxDOT.

Manufacturers will be notified, after their material has been evaluated, as to conformance with the requirements of this specification.

Performance History

Some of the tests required by this specification extend over a prolonged period of time. Therefore, testing for acceptance of materials supplied on any contract or state purchase order will only be considered on those materials which are determined by the Director of CST/M&P, to be identifiable as a material having an established performance history of compliance with the criteria established by this specification.

Re-evaluation

When, in the opinion of the Director of CST/M&P, changes have been made in the composition and/or manufacturing process, a re-evaluation of its performance may be required.

TxDOT may conduct additional tests to identify changes in the material.

Changes that are detected in composition and/or manufacturing process, which have not been reported by the manufacturer, may be cause for removal of the material from the list of prequalified materials.

Periodic Evaluation

TxDOT reserves the right to periodically evaluate the performance of materials.

Samples for periodic evaluation of performance will be selected at random from materials submitted to TxDOT on contracts or direct state purchase orders.

Failure of materials to comply with the requirements of this specification, as a result of periodic evaluation, may be cause for removal from the list of prequalified materials.

Sampling and Testing

Sampling and testing shall be in accordance with CST/M&P *Manual of Testing Procedures.*

Costs of sampling and testing are normally borne by TxDOT; however the costs of sampling and testing of materials failing to conform to the requirements of this specification shall be borne by the contractor or supplier.

Costs of sampling and testing of failing material shall be assessed at the rate established by the Director of CST/M&P and in effect at the time of testing.

Amounts due TxDOT for conducting such tests will be deducted from monthly or final estimates on contracts or from partial or final payments on direct purchases by the State.

Material Requirements

This specification covers the general and specific requirements for four (4) classes of non-reflective background coatings.

General

All classes of non-reflective background coatings shall meet all requirements of this specification except when specific requirements are shown for a particular class of non-reflective background coatings.

Classes (Non-reflective Background Coating)

- Class A shall be polyvinyl fluoride film bonded to the substrate surface with adhesive(s) approved by the polyvinyl fluoride film manufacturer.
- Class B shall be an acrylic film bonded to the substrate surface with adhesive(s) approved by the acrylic film manufacturer.
- Class C shall be a thermosetting polyester-powder coating.
- Class D shall be a thermosetting polyvinylidene coating applied over a primer recommended by the manufacturer of the polyvinylidene coatings.

Film Thickness

The various classes of non-reflective background coatings shall meet the requirements as shown below for the various classes.

Film Thickness		
Class	**Micrometers**	**(Mils)**
A	25 minimum	(1.0 minimum)
B	75 minimum	(3.0 minimum)
C	100 to 300	(4.0 to 12.0)
D	25 minimum	(1.0 minimum)*

*Minimum thickness of primer shall be five [5] micrometers (0.2 mil) and minimum thickness of the polyvinylidene coating shall be 20 micrometers (0.8 mil).

Color

The diffuse day color, of all classes of non-reflective background coatings, before and after Weather-Ometer (Atlas, Sunshine Type) exposure used according to ASTM G 23, shall comply with the color requirement specified below.

Color requirements are defined by an enclosed area formed by using the CIE Chromaticity Coordinates as corner points and the listed Y reflectance limits.

Color shall be tested in accordance with Test Method "Tex-839-B, Determining Color in Reflective Materials."

Chromaticity Coordinates			
Color	**Chromaticity**		**Reflectance**
	x	**Y**	**Y**
White	0.310	0.300	40 Minimum
	0.290	0.320	
	0.360	0.360	
	0.340	0.380	
Green	0.250	0.330	3.5 - 10
	0.250	0.430	
	0.020	0.540	
	0.030	0.370	
Yellow	0.440	0.460	30 - 60
	0.490	0.510	
	0.540	0.460	
	0.490	0.410	
Red	0.600	0.290	5 - 12
	0.700	0.300	
	0.650	0.350	
	0.550	0.340	
Brown	0.430	0.340	3 - 8
	0.430	0.390	
	0.560	0.440	
	0.600	0.400	
Blue	0.130	0.050	1.8 - 9
	0.230	0.200	
	0.200	0.240	
	0.090	0.150	

Gloss

The gloss of all classes of coatings at 60 degrees (ASTM D 523) shall be as follows:

Gloss of all Coatings Classes	
Color	**Gloss at 60 degrees**
White	60 – 90
Green	90 Maximum
Yellow	90 Maximum
Red	90 Maximum

Infrared Analysis

All coatings shall match the infrared spectra on file with CST/M&P.

The infrared spectrum shall be tested in accordance with Test Method "Tex-888-B, Obtaining the Infrared Spectrum of Organic Materials."

X-ray Diffraction Analysis

All coatings shall match the X-ray diffraction pattern on file with the CST/M&P.

The X-ray spectra shall be tested in accordance with Test Method "Tex-896-B, Qualitative and Semi-Quantitative Analysis of Crystalline Material by X-ray Diffraction."

Applied Film Characteristics

All coatings shall meet the following requirements after the coatings have been applied to background substrate.

- Adhesion - There shall be no removal of the coating when tested as follows:
  - Using a sharp knife, make six (6) or more parallel cuts at three (3) millimeter (0.125 inch) intervals through the finish to substrate.
  - Crosshatch similarly.
  - Apply Scotch cellophane tape firmly to the scribed area.
  - Pull the tape off with a sharp jerk. No loss of adhesion shall occur.
- Pencil Hardness - The applied coatings or films shall have a pencil hardness of F minimum in accordance with ASTM D 3363.
- Durability - The applied coatings or films, when subjected to the following tests, shall exhibit no loss of bond strength, blistering, checking, crazing, chalking, or other film appearance and/or adhesion defects.

Test and Exposure Time for Durability

Tests	Exposure Time
Boiling water immersion	100 hours
Fog Chamber - 37 °C (100 °F) & 100 percent Relative Humidity	12 weeks
Atlas Weather-Ometer (18 - 102 cyclic gear, Test Method, "Tex-801-B, Testing Coatings and Related Materials.")	3,000 hours